

hurricane squalls, with wind blowing constantly from the northwest. On these two days gales of force 10 to 12 covered the area between 150° and 170° E., 30° and 50° N.

On the succeeding days of the month storm to hurricane winds were reported as follows: On the 24th, by the American S. S. *West Niger*, NW. 11, lowest pressure 29.35 inches, in 36° 41' N., 152° 33' E.; on the 25th, by the Japanese S. S. *Manila Maru*, NE. 11, lowest pressure 29.39, in 44° 19' N., 159° 34' E.; on the 27th, by the American S. S. *West Chopaka*, NW. 11, lowest pressure 29.35, in 37° 19' N., 148° 04' E.; on the 31st, by the American S. S. *Dilworth*, SE. to WSW. 11, lowest pressure 28.88, in 34° 58' N., 156° 16' E.

From the two foregoing paragraphs, it will be seen by how narrow a margin of escape from preceding and subsequent rough weather did the *President Jefferson*, previously mentioned, day by day make her remarkable, storm-free voyage.

Attention must be directed to the area lying along the canal route between the 85th and the 100th meridians. Unusual storm conditions prevailed from the 5th to the 9th throughout this region, the winds becoming especially violent on the 6th and 7th over the Gulf of Tehuantepec. The American S. S. *Steel Scientist*, southward bound, commented as follows:

January 5. Encountered a wind from NNE. in latitude 14° 56' N., longitude 96° 32' W., barometer 29.91. Constant blow from NNE., reaching up to force 11, lowest barometer 29.81 on the 6th, in 14° 44' N., 96° 06' W. Ended Jan. 7 in latitude 13° 06' N., 93° 53' W., barometer 29.97. On the 7th encountered a wind from the E., barometer 29.80, in latitude 10° 01' N., longitude 88° 23' W.

The American S. S. *D. G. Schofield*, southward bound, experienced a hurricane from the northeast at 1 p. m. of the 6th, lowest pressure 29.96, in 15° 09' N., 94° 27' W. The gale continued to be experienced by the vessel until well into the 7th when, at 6 a. m., the wind was north-northwest 9, pressure 29.98, in 13° 27' N., 93° 58' W. On the 8th and 9th other gales were encountered, the highest force being 9 from the northeast, on the 9th, lowest pressure 29.85, in 10° 06' N., 87° 31' W. Several other vessels noted gales of force 8 to 10 at this time.

On the 20th to 23d high winds, though not exceeding 10 in force, occurred in the same region. The American S. S. *W. S. Rheem* early on the 21st was in a northwesterly gale, force 10, pressure 29.82, in 15° 52' N., 93° 54' W., and the American S. S. *Hampton Roads* on the 23d experienced a northeasterly gale, force 8, in 9° 42' N., 86° 11' W.

During the prevalence of these storms a strong norther occurred over the Gulf of Mexico.

Fog occurred more frequently in January than during the preceding month. On the China coast the phenomenon was noted on the 13th to 16th. Along northern and middle latitudes in west longitudes fog occurred on several days. None was reported from east longitudes, except as noted. Fog showed a considerable increase along the American coast, and was frequently observed outside the harbors of Seattle, San Francisco, and San Diego. One record comes from 10° 43' N., 90° 19' W., where it was observed on January 12 over a cool current of water.

DETAILS OF THE WEATHER IN THE UNITED STATES.

551.506 (73)

GENERAL CONDITIONS.

ALFRED J. HENRY.

The month was cold and generally dry, the drought being most pronounced on the Pacific coast and thence eastward to the Rocky Mountains; precipitation was in excess of the normal over a narrow strip extending from the East Gulf States northeastward to New England (see inset chart of Chart IV).

The defect in temperature was due to the passage of four vigorous anticyclones across the country. The usual details follow.

CYCLONES AND ANTICYCLONES.

By W. P. DAY.

The month of January showed an increase in activity over the preceding month, particularly in the number and strength of the high-pressure areas. Twelve of the latter made their appearance in the Canadian Northwest and half of these followed a well-defined path southeastward down the Missouri Valley and thence eastward or east-northeastward to the Atlantic coast. During the evening of the 4th and the morning of the 5th there were two separate high-pressure areas with barometer reading over 31 inches, one nearly stationary over the northern Plateau and Rocky Mountain region and the other moving southeast over the middle and lower Missouri Valley.

The Alberta type was the most frequent low charted; but the more important storms of the month developed over southwestern districts.

FREE-AIR SUMMARY.

By L. T. SAMUELS, Meteorologist.

The outstanding feature of Table 1 is the subnormal monthly mean temperature at all stations and practically all levels. The most severe cold wave of the month occurred on the 4th and 5th. During this period minimum temperatures exceeded all previous January records at most of the aerological stations. At Ellendale the lowest temperature for the month, -39° C. (-38° F.), occurred at 3,500 m. and at Drexel, -26° C. (-15° F.), at 2,500 m. on the 4th; at Broken Arrow, -22° C. (-8° F.), at 650 m.; at Groesbeck, -10° C. (14° F.), at 1,050 m., and at Royal Center, -33° C. (-27° F.), at 900 m. on the 5th.

It is of interest to note some of the changes in the free air over Ellendale as shown by the kite records of these two dates (4th-5th). These are shown in the following table:

Free-air conditions above Ellendale, N. Dak., on January 4-5, 1924.

[Altitude (meters) above sea level.]

	Date.	Surface 444.	1,000	1,500	2,000	2,500	3,000	3,500
Temperature (°C.)	4	-31.0	-33.9	-33.5	-33.7	-34.6	-36.7	-38.9
	5	-31.8	-18.4	-15.7	-14.9	-13.6	-12.3	-11.6
Relative humidity (per cent.)	4	81	89	88	86	84	84	84
	5	83	48	29	17	21	25	29
Vapor pressure (mb.)	4	0.26	0.22	0.23	0.22	0.20	0.16	0.13
	5	0.27	0.59	0.46	0.29	0.40	0.53	0.66
Wind direction and velocity (m. p. s.)	4	NW.	N.	N.	N.	N.	N.	N.
	5	7.6	16.5	16.6	17.4	18.6	19.1	19.6
		SSW.	W.	WNW.	NW.	NNW.	NNW.	N.
		5.8	8.4	8.5	9.6	14.2	18.7	22.5